

WATER QUALITY *and* WATER RESOURCES WHITE PAPER

Note: The following information is provided to help inform discussions at the Summit. Please understand, however, that this is not meant to be an exhaustive discussion of this natural resource, nor is it meant to confine your discussions at the Summit. Please bring your own knowledge, expertise, creative ideas and suggestions to the table!

WATER QUALITY

BACKGROUND

State-wide - The recently completed 2006 Water Quality Assessment designates a total of 1,712 waters throughout the Commonwealth as impaired because they do not meet water quality standards. The water quality standards are established to protect drinking water supplies, aquatic life, agricultural and industrial uses, and recreational uses including swimming, boating, fishing and shellfish harvesting. Currently all of Virginia's waters are classified as swimmable, with water quality standards designed to protect the potential swimming use. Many of the waters that do not meet water quality standards fail because of bacteria levels above the water quality standards that are designed to protect waters for this use, but others are also impaired as a result of pH, temperature, sediment, toxic chemicals and other impairments. The extent of the impairments is as follows:

Waterbody Types in Virginia	Impaired Waters - 2006 Assessment
Rivers - 50,357 miles	8,984 miles
Lakes - 116,058 acres	109,208 acres
Estuaries - 2,428 sq. miles	2,216 sq. miles

New impairments were identified in 2006, primarily due to DEQ's assessment of waters which had not previously been monitored, or due to more stringent water quality criteria. While 1,059 river miles were added to the 2006 Impaired Waters List, 381 river miles were removed from the list because the 2006 assessment showed these waters achieving standards.

The Chesapeake Bay - The single greatest challenge faced by Virginia's water quality management program is the restoration of the Chesapeake Bay. Over 2,000 square miles of Bay waters are impaired due to low dissolved oxygen, poor water clarity, and high concentrations of algae. Slightly over half of the Commonwealth's land area is located within the Chesapeake Bay watershed, but Virginia's portion only represents about 35% of the total land area of the entire Bay watershed. While the Bay restoration will require an enormous effort by Virginians, we

cannot restore the Bay without a similar level of effort by the citizens living throughout the 64,000 square mile watershed that includes parts of five other states and the entire District of Columbia. Virginia has developed “tributary strategies” for each of the Bay’s tributary rivers that have put into focus the magnitude of actions necessary to reduce nitrogen, phosphorus and sediment sufficiently to achieve water quality goals.

CLEAN-UP TOOLS

Total Maximum Daily Load (TMDL) program – This process provides the management framework for restoring water quality in Virginia’s impaired streams, rivers, lakes and estuaries. The major steps under the TMDL program include: development of the TMDL, development of a TMDL Implementation Plan, and implementation. Follow-up monitoring of impaired waters is periodically conducted to track the response in water quality to management actions and to provide the basis for any adjustments to the TMDL-Implementation Plans. To date, Virginia has completed 381 TMDLs and 36 Implementation Plans. Implementation is ongoing in all watersheds with completed plans, and while improvements in water quality have been measured in some watersheds, in no watershed has all of the pollution management actions been taken that are needed to fully achieve water quality standards. To date, approximately \$13.5 million has been spent in developing TMDLs. However, the amount expended on implementation is more difficult to estimate since not all implementation expenditures are tracked, for example voluntary BMP installations by private citizens or programmatic improvements by local governments may not be documented to the fullest extent. About \$3 million in federal 319 funds have been expended on TMDL implementation as well as substantial funding from other federal programs, the Equality Incentive Program and Conservation Reserve Enhancement Program, and state programs, the Water Quality Improvement Fund.

Point Source Regulations - Major regulatory advancements provide a strong foundation for the Bay restoration effort. New water quality standards for the Bay define, for the first time, the water quality conditions that define a restored Chesapeake Bay. In addition, three new regulations governing significant point source dischargers in the Bay watershed define: 1) nutrient “loading caps” (maximum *pounds* of nitrogen and phosphorus allowed to be discharged annually from each particular facility), 2) technology performance requirements (maximum *concentration* of nitrogen and phosphorus - expressed in milligrams per liter – allowed to be discharged from each particular facility) and 3) and an innovative nutrient credit trading program that is designed to achieve the necessary nutrient reductions in a timely and cost effective manner.

Tributary Strategies - Virginia’s tributary strategies also present a compilation of both point and nonpoint source actions needed to achieve Virginia’s portion of the Bay restoration effort. However, the state agencies have always expected changes would be made to the Tributary Strategies to reflect lessons learned as the implementation phase proceeded. A different mix of practices at the local watershed level may be more cost-effective and practical to implement than the original Tributary Strategy identified.

Virginia Impaired Waters Clean-up Plan - A major development that will guide Virginia's water quality management programs into the future is passage of House Bill 1150 by the 2006 General Assembly - - the Chesapeake Bay and Virginia Waters Clean-Up Plan and Oversight Act; §62.1-44.117 and §62.1-44.118 of the Code of Virginia. The Secretary of Natural Resources is charged with the responsibility of developing a Virginia Impaired Waters Cleanup Plan. The deadline for the initial plan is January 1, 2007, with plan updates and reporting of progress to the General Assembly every six months.

Components of the plan will include:

- | | |
|--|-----------------------------------|
| 1. Measurable and attainable objectives | 5. Risk mitigation strategy |
| 2. Implementation strategies and timeframes | 6. state/local coordination |
| 3. Prioritized program of work & disbursement plan | 7. Alternative funding mechanisms |
| 4. Potential problem areas | 8. Legislative actions |

To assist in developing the initial plan, a stakeholder forum was conducted at VCU on July 21 during which 83 participants responded to, and discussed, questions, such as: What should Virginia focus on? What should Virginia be doing for water quality protection and restoration that we are not doing? What roadblocks exist that might delay implementation, and how do we remove those roadblocks? How do we set reasonable and achievable time frames for the clean-up?

Messages from the stakeholder forum:

- Need to show positive results, even at local scale
- Need for more public education
- Citizens, local governments, and private sector need ownership of problems to motivate action
- State agencies should better prioritize and target their efforts
- Improve coordination between state and local governments
- Long term funding for water quality programs is needed

Complete summaries of the forum can be found at this web address:

<http://www.naturalresources.virginia.gov/Initiatives/VirginiaWaterCleanupPlan/index.cfm>

CHALLENGES

Improving Wastewater Treatment - Expedient installation of nutrient removal technologies at numerous wastewater treatment facilities within the Chesapeake Bay watershed presents a major challenge. Current cost estimates for needed upgrades to Virginia facilities range from \$1.5 to \$2.0 billion. Effective utilization of the new Nutrient Credit Exchange Program is necessary to ensure these upgrades are both timely and cost-effective.

Increasing attention is being directed towards "emerging contaminant" issues that may impact human health, such as improper household disposal of unused medications that are commonly

flushed down the drain. These pharmaceutical wastes are an example of emerging contaminant issues that will increasingly challenge all facets of water quality management, such as, identifying monitoring and analytical protocols, establishing proper water quality standards, setting permit limits and effective wastewater treatment.

Addressing Stormwater Run-off and Improving Erosion and Sediment Control -

Inadequately managed stormwater, which transport pollutants from developed lands, is the fastest growing source of nonpoint source pollution in Virginia. Once stormwater is collected into a conveyance system it is considered a “point source” discharge of pollution. State laws aimed at controlling pollution from land-disturbing activities are poorly enforced by most localities statewide. Only about 30% of local government Erosion and Sediment Control programs are operated in a manner consistent with state requirements. Thousands of acres of developed land have little or no controls in place to adequately address the quality and quantity of stormwater run-off. Current development practices are not adequately addressing the negative impacts of increased impervious surface on groundwater and surface runoff.

Addressing Urban/Suburban-Specific Runoff Issues - Water quality is also affected by land use practices and citizen behavior in urban settings. Lawn care practices, particularly fertilizer application, can be significant sources of excess nutrients in urban and suburban settings. Water quality can also be compromised by improper management of pet waste and other diffuse sources.

Decreasing Agricultural Runoff - Agriculture is the 2nd largest land use in Virginia and is considered the largest contributor of excess nutrients and sediment to nonpoint source pollution. The majority of state and federal pollution reduction programs are incentive-based (cost-share, tax credits, etc.). They rely upon voluntary adoption of conservation best management practices such as nutrient management, conservation tillage, cover crops, riparian buffers, and livestock exclusion. The applications some biosolids, animal waste and industrial sludge are controlled under current state regulations. Widespread participation in conservation programs must be increased considerably in order reach our nonpoint pollution goals. It is estimated that 92% of all agricultural lands in the Virginia’s portion of the Bay watershed must implement several conservation practices to achieve our water quality goals.

Protecting Wetlands - In addition to the habitat and stormwater assimilation values, wetlands provide important water quality improvement functions. The Virginia Water Protection Permit (VWP) program and the federal Clean Water Act §404 permitting program, as well as the state tidal wetlands program at VMRC, regulate impacts to Virginia’s wetlands. Our state programs are mandated to ensure no net loss of wetland acreage and function. Acreage losses and gains are tracked through our permitting programs and voluntary restoration and protection programs. DEQ is also working with VIMS to provide GIS based maps of our wetland resources in each watershed, along with indications of their quality in terms of providing key wetland services. We will then have the capability of looking at changes in each watershed over time and targeting improvements to our watersheds most in need of increased acreage and quality of wetlands to meet our water quality and wetland goals.

Addressing Multi-media issues - Fifty-three waters are currently impaired because the Virginia Department of Health issued fish consumption advisories due to PCB and mercury contamination. Also, air deposition has been identified as a major source of nitrogen pollution to the Chesapeake Bay, with much of it emanating from outside of Virginia and other the Bay

states. As TMDLs are developed for these impaired waters, appropriate pollutant load cap allocations need to be assigned to all sources, even those currently regulated under air and waste laws or located outside of the Commonwealth's jurisdiction. Achieving water quality standards may require sources that have not previously been regulated under water law to take additional pollution control actions to restore water quality.

Minimizing Impacts of Growth - Growth has direct impacts on the potential for pollution from both point and nonpoint sources. Population growth and industrial development result in challenges for the proper treatment of wastewater and the use/disposal of biosolids and industrial sludge. Development increases urban acreage at the expense of forest and farmland. Demand for applying biosolids and other waste to agricultural lands grows even while the available agricultural land shrinks. The conversion of land from agricultural use to urban uses with the concurrent increase in the amount of impervious surfaces changes the hydrology of a watershed and compromises the physical and biological integrity of waterbodies.

Effective use of the Nutrient Credit Exchange Program may provide a means to accommodate growth in the volume of wastewater discharged from growing communities in the Chesapeake Bay watershed, and establish market-based incentives to aid in achieving nonpoint source reduction goals. Additionally, certain types of innovative stormwater control and erosion and sediment control programs can help minimize the impacts of a growing population.

Securing Long-Term Funding - There has not been sufficient and reliable funding for water quality improvement in Virginia. Funding for nonpoint source pollution control programs has historically fluctuated significantly from year-to-year. Voluntary programs are very susceptible to negative impacts from on-again, off-again funding to the extent that their effectiveness can be compromised. Local governments have not provided resources adequately to properly implement the state required pollution control programs and limited state resources have hampered support, oversight and enforcement of locally implemented programs including stormwater management, erosion and sediment control and the Chesapeake Bay Preservation Act. While recent deposits to the Water Quality Improvement Fund increase the available grant funds for point source upgrades to approximately \$280 million, the estimated additional cost to meet the nutrient removal requirements for the Chesapeake Bay approaches two to three times that amount.

Ensuring TMDL Implementation - While federal law requires the preparation of TMDL plans for impaired waterways, implementation is a requirement of state law. However, in TMDL watersheds where nonpoint sources are the cause of impairments, the implementation of remediation plans is based on voluntary action (often supported with state cost-share or incentive programs.) While this can be effective, it does not guarantee that the causes of impairments will be addressed.

QUESTIONS TO CONSIDER

- What *specific* actions would help us achieve these goals and commitments in the next three years? Public actions? Private actions? Public-private actions?
- How can pollution prevention and participation in voluntary programs be significantly increased? (new information? new/better incentives?)

- What specific kinds of environmental education would help achieve our water quality goals?

WATER RESOURCES

BACKGROUND

Water Supply Planning - The significant drought of 1999 through 2002 resulted in a realization that active water supply planning efforts are required to assure that all Virginians have a safe and adequate water supply and that water is available to support commercial, industrial and agricultural uses while assuring protection of in-stream uses. A technical advisory committee deliberated these issues over a two year period resulting in the adoption of Water Supply Planning Regulations. These regulations require that all localities within the Commonwealth develop local or regional water supply plans indicating how water will be supplied to existing users and foreseen development over a 30 to 50 year period.

Regulation of Water Withdrawals - An accurate accounting of the amount of water withdrawal is required to assure that available water resources are sufficient to support existing in-stream and off-stream uses and to allow the Commonwealth to make informed decisions regarding future proposed uses of water resources. These withdrawal amounts are captured in ground water withdrawal permits within designated ground water management areas, Virginia water protection permits for surface water withdrawals not exempt from permitting requirements, and by water withdrawal reporting regulations for all other users.

The amount of water withdrawn from state waters and the amount that is returned in the form of discharges is a critical information requirement in a meaningful water resources management program. Any person who withdraws more than 10,000 gallons per day of surface and/or ground water is required to annually report their withdrawals.

There are currently two ground water management areas in Virginia. These areas occupy the lower two thirds of the Virginia Coastal Plain and the Eastern Shore of Virginia. In these areas, permits must be obtained to authorize ground water withdrawers and the review of each permit application includes an analysis of potential impacts to the aquifer and to existing users.

Surface water withdrawals and other impacts to streams and wetlands are permitted under the Virginia Water Protection Regulation. This program is designed to maintain instream flows, to assure that in-stream and off-stream beneficial uses are protected, and to assure no net loss of wetland acreage and function.

CHALLENGES AND OPPORTUNITIES

Water Supply Planning – The Local and Regional Water Supply planning regulations require the submittal of plans on a staggered basis based on the population of the locality. The first plans will be due in November 2008 for the largest localities, plans for the smallest localities are due in November 2010 and regional plans are due in November 2011. DEQ is able to provide

limited technical support and some grants to assist with these efforts. The long-term effectiveness of this program, however, depends upon the quality of the local and regional planning efforts.

Water Resource Characterization - A meaningful water supply planning effort must be informed by an accurate understanding of the availability of water under all environmental conditions. There are limitations to the data currently available.

Ground Water Resource Characterization: Localities who are dependent on ground water as their primary source of water supply need information regarding the availability of ground water in their area. Information is required within ground water management areas to support the issuance of appropriate ground water withdrawal permits. DEQ has initiated a ground water resource characterization effort, specifically in the area west of Interstate 95. While this level of activity is significant compared to recent efforts, it is likely that more will be required to provide the level of technical and financial assistance needed for the water supply planning and ground water withdrawal permitting programs as these efforts mature.

Surface Water Characterization: DEQ and the USGS operate a complimentary network of surface water gaging stations to monitor stream flows in the Commonwealth. Information produced by this program are used in water supply planning efforts, development of appropriate stream loadings for waste water assimilation, drought monitoring, and flood warning. While there is currently adequate coverage of major streams in Virginia, there is a need for better coverage on second and third order streams. The lack of second and third order stream coverage will continue to hinder the Commonwealth's ability to adequately manage these resources.

Limitations on future ground water withdrawals - In specific areas of the Virginia Coastal Plain it is likely that the ground water resource is fully allocated and additional requests for ground water withdrawals will be denied. In large areas of the Coastal Plain, ground water is the only feasible source of water supply to support future development. There is also a need to consider expanding the existing ground water management area to the northern third of the Coastal Plain because impacts to ground water levels have propagated into this area.

Limitations on Surface Water Withdrawals - Surface water withdrawals are permitted under the Virginia Water Protection Regulation. This regulation has a legislative exemption that allows surface water withdrawals that were in existence prior to 1989 to increase their withdrawals up to the capacity of their existing intakes. In some cases this capacity may be two- to three-fold greater than their current withdrawal amounts. Pending amendments to the VWP regulation will require these "grandfathered" withdrawals to report the amount that they believe they are entitled to and will require DEQ to consider these amounts when applications for new permits are considered. This will likely result in the denial of some surface water withdrawal permits due to withdrawals that currently do not exist and may not materialize in the future. Currently about 10% of the known surface water withdrawals greater than 10,000 gallons per day are subject to the provisions of the VWP regulation.

Water Reuse Opportunities - As demands on the Commonwealth's limited water resources increase, the importance of utilizing reclaimed water in lieu of water directly withdrawn from ground or surface becomes increasingly beneficial to economic development and environmental protection. Waste water can be safely reclaimed and reused for commercial, industrial,

landscaping and countless other applications. Appropriate reuse of reclaimed water has the potential to reduce pollution loadings to surface waters as well as reduce the demands for water withdrawals. Care must be taken, however, to ensure that reuse projects do not simply transfer the pollution impacts from one media (surface waters) to another (another surface water body or ground water).

DEQ is currently working with a technical advisory committee to develop water reuse regulations that will encourage the reuse of reclaimed waste water. There are other barriers, however, to reuse efforts. For example, a significant opportunity has been identified with the potential to replace existing industrial process water withdrawals from ground water in the Coastal Plain. Two existing paper production facilities in the Coastal Plain are reliant on ground water withdrawals as the source of their industrial water supply. These two users collectively withdraw almost half of the total ground water withdrawn in this area. There is the potential to supply these two industrial users with reclaimed water that will meet their needs from a water quality and quantity standpoint. Very preliminary estimates indicate that infrastructure costs associated with developing transmission pipelines from existing wastewater treatment facilities that produce the volume of water necessary to support these industrial uses and that are interested in developing a water reclamation system capable of supplying the appropriate water quality may exceed fifty million dollars. While this preliminary infrastructure cost appears high, it is important to realize that the successful completion of such a reuse project would significantly increase ground water availability in the Coastal Plain that would be available to support future demands.

QUESTIONS TO CONSIDER

- How do we ensure that Virginia will be able to provide the quantity and quality of water resources its citizens and visitors expect and demand?
- What *specific* actions would help us achieve these goals and commitments in the next three years? Public actions? Private actions? Public-private actions?
- How can pollution prevention be encouraged? What information or incentives are needed to encourage pollution prevention?
- What specific kinds of environmental education would help achieve our water resource goals?

NOTES:
